Space Weather Forecast

Issued on Monday, 15 May 2023 at 12:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance or Slight Chance of R1/R2 radio blackouts throughout. Slight chance of a G1/Minor Geomagnetic Storm late Day 1 or Day 2.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the last 24 hours, with the largest flare, a longevity Common-class flare, observed at 15/0800 UTC, which appears to have originated from around the southeast limb. There are currently six numbered sunspot regions on the visible disc. The largest sunspot group is located in the northeast quadrant, although it has not yet produced any notable flares. All remaining sunspot groups are relatively small and stable. A small filament lift-off)arc of plasma) was observed in the northwest quadrant early on the 15th, which produced a very faint Coronal Mass Ejection (CME). This is yet to be analysed for any possible Earth-directed component. No Coronal Mass Ejections (CMEs) of significance were observed in the period.

Solar Wind / Geomagnetic Activity: slowly increased to elevated levels at the start of the period, with a peak of 545km/s at 14/2016UTC, before a steady declining to the current slightly elevated levels, near 460km/s. The interplanetary magnetic field (IMF) has been mostly weak. The important north-south component was mostly weak, except for a fluctuation to southwards orientation between 14/1434-2016UTC. The net result of the above solar wind measures was mostly Quiet (Kp0-2) to Unsettled (Kp3) geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to remain at Low levels with a chance of returning to Moderate, with this risk greatest over the next 24 hours while the most complex spot group remains close to the western solar horizon, and perhaps again on Day 4 (18 May) as the largest region rotates into a more geoeffective position.

Solar Wind / Geomagnetic Activity: Geomagnetic conditions are expected to remain largely Quiet (Kp0-2) to Unsettled (Kp3). On Days 1-2 (15-16 May) there is a slight chance of glancing blows from Coronal Mass Ejection (CME) events that left the Sun 11-13 May producing minor effects at Earth and a G1/Minor Geomagnetic storm (Kp5) interval. However misses are considered more likely with no observable effects. Solar winds are expected to remain at, or just above, slightly elevated levels.

Energetic Particles / Solar Radiation: There is a daily slight chance of S1, decreasing through the period as the main sunspot responsible for this risk continues to recede westwards.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	25	20	20	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	2	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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